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Safety, Health and Environmental Annual Report 2011

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Glossary

	Dutch	English
BHV	Bedrijfshulpverlening	In-company Emergency Response Team
BSI	British Standards Institute	British Standards Institute
CPR	Commissie voor de Preventie van Rampen door gevaarlijke stoffen	Committee for the prevention of disasters by hazardous substances
ECN	Energieonderzoek Centrum Nederland	Energy research Centre of the Netherlands
EMAS	Eco-Management and Audit Scheme	Eco-Management and Audit Scheme
EMS	Milieu Management Systeem	Environmental Management System
EPBD	Europese richtlijn energiepresentatie gebouwen	Energy Performance of Buildings Directive
EPC	Energiepresentatiecertificaat	Energy Performance Certificate
GHG	Broeikasgassen	Greenhouse gases
GHS	Globally Harmonized System (of Classification and Labeling of Chemicals)	Globally Harmonized System (of Classification and Labeling of Chemicals)
HFR	Hoge Flux Reactor	High Flux Reactor
HSC	Commissie voor Veiligheid, Gezondheid en Milieu	Health and Safety Committee
IET	Instituut voor Energie en Transport	Institute for Energy and Transport
INO	Intern Noodplan Onderzoek Locatie Petten	Internal Emergency Plan Research Site Petten
ISO	Internationale Organisatie voor Standaardisatie	International Organisation for Standardization
JRC	Gemeenschappelijk Centrum voor Onderzoek (GCO)	Joint Research Centre
KFD	Kernfysische Dienst	Department of Nuclear Safety, Security and Safeguards
NRG	Nuclear Research and consultancy Group	Nuclear Research and consultancy Group
OHSAS	Handleiding voor het opzetten van een ARBO-managementsysteem (vrij vertaald)	Occupational Health and Safety Assessment Series
RSC	Reactor Veiligheidscommissie	Reactor Safety Committee
SCBA	Ademhalingstoestel	Self contained breathing apparatus
SES	Veiligheid, Milieu en Beveiliging (Sector)	Safety, Environment and Security (Sector)
VOC	Vluchtige Organische Stoffen	Volatile Organic Compounds
VROM	Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer	Ministry of Housing, Spatial Planning and the Environment
Wabo	Wet algemene bepalingen omgevingsrecht	Environmental Licensing (General Provisions) Bill
Ww	Waterwet	Water act

Executive Summary

This report is the integrated Safety, Health and Environmental Annual Report 2011 of the Institute for Energy and Transport (IET) of the JRC at the Petten site. The report is split in a health and safety part and an environmental part. The report includes a description of the organisational systems and structures together with the planned activities and the achieved goals. The environmental part contains in addition an assessment of the environmental impact of the Institute. This report only refers to the activities of the JRC-Petten site of the Institute. The Institute has implemented a Quality Management System of which Environmental and Safety Management is an integral part. Internal audits and external inspections by Dutch authorities have not identified a significant deviation from legal requirements. The institute will continue to improve the environmental and safety system in 2012 and will amongst other things focus on improving energy performance of the institute.

Introduction

The research activities of the Institute are carried out under the 7th Framework Programme (2007 to 2013) of the Commission. The Framework Programme is the legal basis for the work of the JRC and thus also of the Institute for Energy and Transport. The Framework Programme outlines in general terms the main priorities for Research and Development (R&D) funded by the European Union. Nuclear R&D is approved by the European Council, whereas non-nuclear R&D is approved by a co-decision between the European Council and the European Parliament.

Within the current Framework Programme the activities of the Institute for Energy and Transport in Petten have not significantly changed. However there is an increase in the desk top type activity with the recent creation of a new unit which deals with the area of Energy Security. This change has no impact on safety, health and environmental issues at the Institute.

Over the last couple of years environment, safety, health and well-being have received continuous attention and a high priority within the Commission and at the Institute for Energy and Transport. The Institute's Environmental Management System was implemented and first certified in 2004 according to ISO 14001. The development of a Safety Management System had been completed in 2008 to such an extent, that certification according to OHSAS standard 18001 was achieved in 2009. Environmental and Safety Management are integrated into the overall Quality Management System of the JRC-IET.

With these management systems the IET is continuously striving to be a safer and more environmentally friendly workplace for everyone on site and living in its surroundings.

The units of the institute located in Ispra (Italy) are excluded from this report, since their safety, health and environment related activities are managed by the Ispra Site Directorate. Where 'Institute' or 'IET' is used in this report it refers to the JRC-Petten site.

The Safety, Environment and Security (SES) sector is part of the Site Management Unit and is advising the Director and Staff of IET regarding the regulations of occupational health and safety, radiation protection, environmental protection and is monitoring the respect of the regulations. These tasks are integrated in the Quality Management System.

The Head of the SES sector is responsible for monitoring legislation and is also the liaison officer towards the Dutch authorities. He is in charge of communication of safety and environmental related issues towards the staff and management.

The Site Safety Officer manages the (near-) accident register and organises accident investigations. He further coordinates safety and environmental training of staff, liaises with the fire brigade, and provides support to risk assessments as well as advises staff on a day-to-day basis. In addition, he supports the management in safety tours and can report directly to the Director.

Preventive maintenance of health-and-safety critical equipment (e.g. safety cupboards, hoisting equipment) is performed in close cooperation between the SES sector and the Infrastructure sector.

SAFETY AND HEALTH

Background

At the Institute for Energy and Transport, Petten site, the implementation of the Commission Decision (C(2006)1623) on 'Establishing a Harmonised Policy for Health and Safety at Work for all Commission Staff' has been finalized.
In order to monitor the compliance with this Decision and to constantly improve the safety on site, the Institute has set up a safety management system according to the OHSAS 18001 (2007) standard.
This occupational health and safety management system was originally certified by TNO in November 2009, and was acknowledged by BSI in November 2010.

Safety related goals

Safety Plan 2011

In 2009 the institute management has published for the first time a multiannual Safety Programme for the Petten site. In this Programme 2009-2011 the management has defined safety targets and goals and has confirmed that it will continue to improve the safety management system (SMS). The specific goals for 2011 have been fixed in the Annual Safety Plan, see table below.

SUBJECT
Safety Policy
Review and develop new safety policy
Annual Safety Report
Prepare and complete the 2010 Report
Implement Globally Harmonized System (GHS) for Classification and Labelling of Chemicals
Develop implementation plan for GHS
Safety Awareness Campaign
Implement and monitor the action plan from the safety awareness campaign
Handling of hazardous substances
Remove all long-term unused (15 years) and all inadequate labelled substances
OHSAS 18001
Internal and external audits OHSAS 18001 performed successfully
Emergency preparedness
Organise at least 2 evacuations per building and 2 INO exercises.
Implementation of audit findings
Continued planning, implementation and monitoring of relevant findings emerging from either internal or external audits

All objectives of the plan were achieved. Concerning the Safety Management System according to the OHSAS 18001 standard, the certifying body (BSI) has performed a transfer assessment instead of the two planned external audits.

Safety inspections and audits

At the Institute, Petten Site, various inspections and audits were carried out by staff of the Institute and by external bodies.
There is a well-established practice for the internal inspections made by the Management, internal auditors, and members of the Sector Safety-Environment-Security.
Regular site visits were performed by the European Commissions Medical Service. These visits are primarily intended for personal medical checks but are also used to inspect work places or to give advice on general health related issues.
External inspections were performed by the different local and national inspection bodies. Based on the inspection and audit reports, action plans were drawn up and the required actions were carried out. No major deviations from the licenses were identified in 2011.
In 2011 risk assessments of Radiation Risks in the NDO and PASS laboratories were also carried out. The conclusions showed that the risk levels are extremely low.

For an overview of the 2011 inspections and audits see the table on page 17 in the Environment section.

Safety Related Committees

Health and Safety Committee

The Joint Committee on Health and Safety (HSC) of the Institute is a statutory committee according to European Commission rules. It is composed of members appointed by the Director and members appointed by the staff representatives. The committee is an advisory body for management and staff regarding health and safety matters.
In 2011 the committee had 4 meetings. The main areas dealt with were review of documents belonging to the health and safety management system and review of near-accident and accident reports. The Committee also discussed items like psycho-social support for institute staff, and how the issue would be better approached through the analysis of data on absences from work. The HSC publishes its own annual report.

Reactor Safety Committee

The task of the RSC is to advise the directors of JRC-IET, NRG and ECN on all nuclear safety aspects related to any of their nuclear facilities on the Petten site.
This includes all work and experiments in and around the research reactors and other nuclear facilities as well as facility operations, modification and testing. Licensing documentation, including safety related procedures and instructions affecting the Safety Technical Specifications or safety related procedures and instructions of a facility, which have to be sent to the competent authorities, are also to be reviewed.
The RSC also has the authority to investigate, request additional information and give advice on matters the committee itself believes to be relevant for nuclear safety, including matters brought to the attention of the Committee. The RSC publishes its own annual report.

Safety related training and instructions

To keep staff updated and to increase awareness, representatives of the SES sector provide information on safety and/or environment related matters during Unit meetings. The SES sector also organises so called toolbox meetings to specific groups of staff members like laboratory managers, in line with the requirements of our safety and environmental management systems.
Training and instructions are useful tools to improve the institute's knowledge of workers regarding safety and health at the workplace. IET Petten therefore gives to all its new staff members (about 45 in 2011) general safety instructions within the first month of their arrival. Moreover specific safety related subjects are presented during unit meetings, e.g. results of risk assessments, occupational incidents, etc.
On individual basis staff members have the possibility to request safety related training in accordance with their work area, e.g. course on Self Containing Breathing Apparatus.

AED at JRC IET

Ergonomics at computer work stations

In 2009 risk assessments were performed for all workplaces at the institute. One of the findings was that office work, in particular working on computer work stations, has to be classified as potentially harmful. To reduce this risk, the institute has decided to launch a pilot "Ergonomics at computer work stations". In this context general information on ergonomics at computer work stations and individual workplace assessments have been made in 2010 and 2011. As this initiative was received very positively, it will be more extensively continued in 2012.

Improvement items on pc workplace ergonomics

Third parties

Contractors and external companies working at the JRC-IET receive the document 'Safety regulations for third parties working at the JRC-IET Petten site' before starting their work. All external persons arriving to work on site either have direct supervision by the internal work responsible or are shown the film 'General Safety Regulations at the Research Location Petten' and are given job-specific instructions.

The JRC-IET has organized internal and external safety related training for its staff in 2011 as shown below.

Course name	Duration	Nr. of participants
Radiation Protection:		
Training and Refresher Course on Personal Dosimetry	½ day	19
Safety:		
Crane driver Safe Lifting	1 day	13
Periodic monitoring electrical equipment	½ day	7
AED (first aid)	½ day	20
EHBO (first aid)	½ day	10
Health		
Ergonomics at computer work stations	½ day	40
Emergency preparedness and first aid:		
Emergency Response Team (BHV) Basis	2 days	6
Emergency Response Team (BHV) refresher course	1 days	18
Self containing breathing Apparatus (SCBA) (Basic Breathing Apparatus)	2 days	2
Self containing breathing Apparatus (SCBA)	½ day	20
INO exercises	2 hours	10
Evacuation exercise (all buildings)	2 times	All staff
Evacuation exercise (site)	1 times	All staff
Environment:		
No course given in 2011	-	-

Operational emergency preparedness

To increase the emergency preparedness of all staff, evacuation exercises were held twice in all buildings. The in-company emergency response team had an important role during these exercises. The team consisted of 24 staff members in 2011 who worked in close cooperation with the site fire brigade.
For the members of the JRC-IET Petten emergency crises team so-called 'Table-Top' exercises were organised by the SES sector, in order to train them for their tasks during emergency situations.

Besides the standby rota of the members of the JRC-IET Petten emergency crises team, several other relevant function groups are on an emergency rota system e.g. for the Plant Simulation Testing Laboratory, Fuel Cell Testing facility and the Infrastructural Service.
At the level of the Petten research location, collaboration between the different companies and institutes on-site has taken place to prepare and execute site emergency exercises. In 2011 there was an emergency exercise due to maintenance work , in wich an electricity shutdown in most of the IET Petten buildings took place. This occurrence was used to exercise an IET Petten site evacuation. Lessons learnt during this process are implemented in collaboration by all participants.

The JRC-IET BHV emergency team

Occupational incidents

Within the Institute an internal reporting system is in use for occupational incidents. The purpose of this system is to get information on potential and actual hazards and to continuously improve the health and safety situation. Over the last three years no accidents with reporting obligation towards the labour authorities have occurred at the Institute. In 2011 there was no accident (in 2010; 4), one minor accident (in 2010; 2) and 27 near accidents (NA) reported. No minor contamination incidents were reported to the nuclear authorities in 2011.

Near accidents reporting

Main causes	2009	2010	2011
Organisational	14	13	10
Technical	14	9	13
Human	8	10	4
Total number of near accident reports	36	32	27

The number of near accident announcements over the past three years have decreased. In 2012 the reporting of near accidents will be promoted.

Work permits

The established work permit system is a suitable tool to improve the safety and health of workers at work and it covers the following types of work and areas:

Controlled areas	All areas where special instructions based on the possible risks in this area are needed.
Excavation work	For work where the knowledge of the existence of underground cables, pipes, drain system, etc. is essential.
Naked flame	For work involving the use of naked flame, or other activities involving the risk of fire, or work when dust is created which smoke detectors can see as smoke.
Confined space	Work in confined spaces such as pits, tanks, reservoirs, crawling spaces or spaces with inadequate or no ventilation.
Working on height	For work on height >2.5 m where there is a risk of falling or of falling objects and for activities that can cause falling, such as openings in floors.

Work permits are valid for a limited period of time. However, for JRC-IET staff annual work permits for specific activities and places can be issued after related safety training. Such general work permits were issued, for example, to staff of the Infrastructure sector concerning working on heights.

The following work permits were given out:

Type of work permit	2009		2010		2011	
	External	Internal	External	Internal	External	Internal
Controlled area	6	0	43		53	
Excavation	38	1	21	2	10	
Naked flame	27	6	29	2	15	5
Confined space	9	0	5		0	0
Working on heights	72	9 *	76	11*	63	23*
Total	168		189		169	

**) including annual work permits*
Note 1) work permits can cover more than one day and more than one person. The number of work permits per year depends on the kind of activities going on at the Institute.
Note 2) from 2009 on the numbers are split into external permits (for work carried out by external companies) and internal permits (for work carried out by JRC-IET staff).

The number of work permits in 2011 has decreased. The majority of work permits were given to external companies. Since April 2008, notes are sent to the responsible unit head if work was performed for which the required work permit either was missing or was not complied with. There were 6 such instances in 2009, 6 in 2010 and 1 in 2011 corresponding to 4%, 3% and almost 0**%,** respectively, of the total number of work permits granted in the respective period, showing an increased compliance with the safety system.

Safety equipment of working on height at JRC-IET for which a work permit is required.

Radiological workers

In 2011, 41 staff members of the Institute for Energy and Transport in Petten (about 15% of all staff) were registered as a radiological worker, including 4 staff members who left the Institute and 6 staff members who joined the Institute during 2011. The measurement and registration of staff exposure to ionising radiation is contracted out to NRG.

The Table below gives the values of the cumulative doses for the last 5 years: 2007-2011. Just over 80% of all radiological workers were Category A (annual allowable dose limit of < 20 mSv). The remaining radiological workers were Category B (annual allowable dose limit of < 6 mSv). For comparison, a non-radiological worker (citizen) has an annual allowable dose limit of < 1 mSv.

Annual Dose of Registered Radiological Workers at JRC Petten

	DOSIS (mSv)		AANTAL PERSONEN			
Jaar	Cumulatief	Gemiddeld	Totaal	< lmSv	1-6 mSv	6-20 mSv
2007	6,57	0,12	54	54	0	0
2008	8,15	0,14	57	57	0	0
2009	5,99	0,11	53	53	0	0
2010	4,73	0,12	40	39	1	0
2011	6,47	0,16	41	39	2*	0

From the table it is clear that the average exposure of registered radiological workers at JRC-IET Petten remains low, as was the case for the previous years. The measured doses for 2011 are well below the limits as defined in the Council Directive 80/836/Euratom and amending Directives.

* Both Radiation Workers, Category A, had measured doses exceeding 1mSv. Both had visited nuclear installation in other countries but the registered doses at the respective installation were well below those measured. It is assumed that both persons had allowed their respective dosimeters, on at least one occasion, to pass through the X-ray machines at International Airports. Nevertheless, as Category A workers, the measured doses are still only around 10% of the allowable annual limit.

Health related activities

Medical service

The staff members of the Institute are under the supervision of the Medical Service of the Commission in Luxembourg. The frequency of visits to Petten by the company doctor is about once every six weeks.
One task of the company doctor and his staff is to perform the annual medical examinations of all staff; another one is to advise on work related matters. In this advisory role inspections of working places were carried out.
The Medical Service is also carrying out annual vaccination campaigns against seasonal influenza. In addition to this, vaccination campaigns against the H1N1 influenza were organised in 2011 on site.
At the level of the Commission, information on health, safety and wellbeing is distributed regularly to all staff members.

Gym facility

The institute has facilitated a gym where staff members can follow their personal training programme developed in consultation with the qualified resident gym instructor or participation in the different group lessons (like e.g. Body Balance or Bag Boxing classes).
In 2011 about 25 % of the Institute staff members continued to use the facility, a decrease of 5% in comparison to 2010. One explanation of this reduction could be related to the change (i.e., decrease) of staff members in 2011. The total amount of instruction time in 2011 was about 500 hours. All gym activities take place outside core hours. The institute has launched a framework contract for maintenance of all the equipment. The gym facility is a demonstration of the importance the management places on the health and well-being of the staff.

Gym facility at JRC IET-Petten

Bike cycles

In 2010 the institute acquired 20 service bikes for staff to be used on the terrain. These bikes can be used by staff during working hours as transportation between buildings or during lunch time to go to the forum restaurant. This initiative was a success in 2011 and is expected to be so in 2012.

Zero emissions, environmentally friendly transport

Other activities

Outside working hours, staff members of the institute have the possibility to participate in a number of sport activities organised by colleagues, such as football, volleyball, badminton, horseback riding and tennis.

IET Petten site infrastructure projects related to SHE in 2011

The infrastructure sector of the Institute is dealing with the management of utilities and facilities. Standard tasks of this sector are the organisation of SHE relevant maintenance and certification e.g. fume hoods, ventilation cupboards, ladders, cranes, first aid equipment.

Also specific SHE related projects are launched and/or supervised by this sector. In 2011 there was an analysis of how to reach the 2020 goals of the long term strategy of the Europese Unie for all buildings by analysing the already existing Energy Performance certificates (EPC) and proposing measures to reach the environmental goals.

Other projects that were planned in 2011 are the renewal of the outside lighting, the removal of R22 containing cooling devices and the upgrade of the Building Management System (BMS) to account for an Energy Monitoring and Control (EMC) component of the BMS. However the aforementioned three projects will be only implemented during 2012.

Examples of SHE relevant certifications

ENVIRONMENT

Background

The Institute for Energy and Transport is committed to assess the environmental impact of past, current and planned IET activities, and to minimise the potential harmful effects of such activities where reasonably possible. In order to achieve this and to fulfil legal obligations, an Environmental Management System (EMS) has been set up according to ISO 14001. It has been implemented and certified in 2004 and has been developing ever since. In 2008 several improvements have been made to the system. The EMS is audited internally and externally every year, and no major deviations or non-conformities were found in 2011. The site environmental licence on main lines requires a certified environmental management system conforming to ISO 14001.
The current certification is granted by TNO Certification and dates from 19 March 2007. The certificate was recognized by BSI in 2010 after an external audit.

Improvements of the heating systems at JRC-IET

EMAS

EMAS stands for "Eco-Management and Audit Scheme" and is a voluntary scheme for organisations willing to commit themselves to evaluate and improve their environmental performance. Following a pilot started in 2001, the Commission decided in 2009 to extend this environmental management system to all its activities and buildings in Brussels and Luxembourg as described in Decision C(2009) 6873. The JRC has stated that it will take into account the Commission-wide policy towards EMAS, starting with ISO 14001 certification for all sites. The Institute for Energy and Transport has been certified for several years now and will continue to improve in this area. The additional registration to EMAS will impose few changes in our way of work and we do not foresee any difficulties.

Environment related goals

Environmental Plan 2011

Long-term environmental targets and goals have been defined in the IET Environmental Programme 2009-2011. The specific goals for 2011 have been fixed in the Annual Environmental Plan.

SUBJECT
Collection, separation, storage, removal and reduction of waste
Continued analysis of waste management approaches to evaluate possibilities to reduce waste
Waste water monitoring/sampling twice a year
Implement energy saving measures
Improvements of heating installations of building 312 & 314
Review/analysis of the compressed air pipe network
Improve monitoring of energy and water usage
Continued improvement of the Energy Monitoring and Control system of buildings and major scientific installations by completing the upgrade of the building management system (new controllers and new electrical meters)
Obtain the Energy Performance Certificate (EPC) for buildings of more than 1000m^2
Determine carbon footprint for the Institute
Determine carbon footprint for 2010 and identify measures to reduce it
Audits and certification
Successful outcome of both internal and external ISO 14001 audits
Assessment of gaps and needs in order to implement EMAS

Waste water monitoring/sampling has been done once a year according to the stipulations of the environmental license (formerly the Waste water license). According to the review/analysis of the compressed air pipe network, the decision has been made to install several autonomous compressed air installations instead of renewing the pipe network.

All other items were handled according to the planning.

Environmental licence

The environmental licence was granted in 2005. Since then experience has been gained on its practical implementation. The activities of the institute are also evolving. Therefore updates or additions are needed regularly; the last one was in August 2011.

Inspections and audits

The IET has an environmental audit programme covering a period of three years. In this programme it is defined which areas of the environmental licence are covered during the internal and external audits and inspections.
The institute's Quality and Environmental Management Systems (ISO 9001 and 14001) were audited in July 2011. This external audit was carried out by the British Standards Institute and was conducted to confirm that the Management System continues to meet the requirements of ISO 9001, ISO 14001 and OHSAS 18001 Management Systems.
Inspections were performed together with experts from different authorities. The results of these inspections are taken up in action plans. The progress of these action plans are reviewed periodically.
In 2011 the following audits and inspections were performed related to (safety and) environmental matters:

	Number
Internal inspections:	
Safety and Environmental Unit Tours (inspection by Unit Head and Site Safety Officer)	1 per Unit*
Facilities for fire prevention, detection and fire fighting equipment (inspection by site fire brigade)	1
EC Medical Service	1
External inspections:	
Environmental Service of the Municipality Zijpe (*Milieudienst Kop van Noord-Holland*)	2 (one on 11 January 2011 and one on 26 and 27 July 2011)
KFD (*Deparment of Nuclear Safety, Security and Safeguards)*	2 (11 January 2011 and 15 March 2011)
Combined inspection by KFD (VROM) and Labour Inspectorate (*Arbeidsinspectie*)	1 (15 March 2011)
Combined inspection by KFD (VROM), Labour Inspectorate, Environmental Service of the Municipality of Zijpe, Province of Noord-Holland / Regional Water Board	1 (8 December 2011)
Internal audits:	
Internal Audits (with respect to ISO 14001 and OHSAS 18001)	1
External audits:	
External Audit by British Standards Institute BSI (with respect to ISO 9001, 14001 and 18001)	1

*most of the units get one a few units get 2 or none safety and environmental tours. In 2012 all units.

Environmental incidents, significant malfunctions

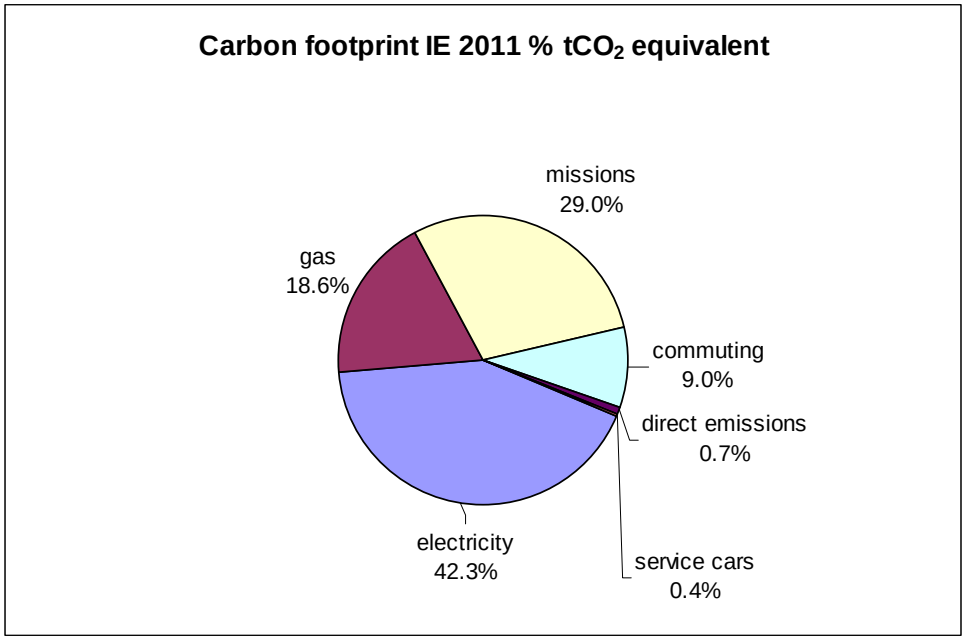
In 2011 no environmental relevant incidents were reported to the environmental service of the municipality.

Carbon Footprint

One of the tools used to evaluate the environmental impact is the Carbon Footprint is the total amount of greenhouse gas (GHG) emissions caused by an organization, event or product. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs, emitted. For IET the contributing factors are energy use on site (electricity and gas), energy use in travelling (missions, commuter traffic and own means of transport) and the direct emission of GHGs. These contributions are summarized below in the table and the figure.

Table Carbon footprint IET 2011

	Ton CO_2 equivalent	Percentage	Source of data
Electricity	1692	42.3	Electricity usage
Gas	744	18.6	Gas usage
Missions	1159	29.0	Number of flights and distances
Commuting	359	9.0	Estimate of travel by car/bus
Direct emissions	26	0.7	Leak of refrigerant
Service cars	16	0.4	Fuel consumption
Total	3997	100	



Nature Management

The four site organisations (JRC-IET, ECN, NRG and Covidien) have developed a nature management plan for the site together with the external company ARCADIS. The goals are to improve the quality of the nature within the site, to establish a common understanding with the authorities on the management of the nature on site, to prepare our contribution to the management plan of the Province and to promote the Petten site, showing that we respect nature. With the present layout of the IET buildings and their appearance, the main impact is on future developments: to keep the group of buildings as much as possible a harmonious entity, to blend in with nature as far as possible and to facilitate the growth of naturally occurring plants.

The open area between the buildings and the Westerduinweg is already for many years kept in the desired state with the help of sheep, the built up area is maintained by an external gardening company.

The Petten site is surrounded on three sides by a natural reserve which has been proposed as NATURA 2000 area by the Dutch authorities. In addition, a part of the JRC terrain has been proposed to be included in NATURA 2000. The proposal has been contested by the institute in 2007, with a proposal to move the border of the NATURA 2000 to the outside of JRC grounds. The final designation decision of the area is still pending on the Dutch authorities. There is no change in the situation compared to 2010.

Winter impression

ENVIRONMENTAL IMPACTS

Energy use

Table Consumption of gas and electricity

Year	Gas (m^3) (excl. HFR)	Gas CO_2 emission (tonnes)	Electricity (kWh) (excl. HFR)	Electricity CO_2 emission (tonnes)	Nr. days with temperature < 0°C *
2008	550 518	980	3 196 097	1 809	58
2009	487 673	868	3 132 962	1 773	65
2010	601 754	1 071	3 399 641	1 924	117
2011	417967	744	2 989 507	1 692	47

*) source www.knmi.nl

Electricity

Due to the scope of the institute activities, the energy consumption fluctuates, mainly depending on the usage of energy by the experimental facilities. The figures shown in the table indicate the total amount of used energy in the Institute. The building management system provides the energy consumption for each building. However in the present situation the consumption of energy cannot be distinguished in the use of heating and lighting and experiments. The building management system will be further improved.

Gas

The use of so-called 'graaddagen' for comparison of gas consumption is at the moment not very useful, since no strict separation can be made between gas consumption used for processes and for utility purposes.

EPC Labels

Reducing energy consumption and eliminating wastage of energy is a main goal of the European Union (EU). 40% of our energy consumed is used in buildings therefore the EU has introduced legislation to ensure that they consume less energy. A key part of this legislation is the Energy Performance of Buildings Directive (EPBD) which requires all EU countries to enhance their building regulations and to introduce energy certification schemes for buildings.
Since 1995 the EPC is a tool in the climate policy in the Netherlands. In 2010 the IET has measured the energy performance of the main buildings of the Institute.

Building	Energy consumption (MJ/ m^2)	CO2 Emission (kg/m^2)	Surface (m^2)	Energy label
308	718	40	2205	B
309	697	39	1965	B
310*	2323	123	1650	G
312	826	46	4406	D
313	986	77	487	D
314	1070	81	361.8	E
325	966	54	1650	E

** Building 310 is considered being an industrial building which means that it does not fall under the requirements of the EPBD*

Emissions to air

There are two main origins for the emissions to air namely from building facility installations (e.g. heating and air conditioning) and from the use of chemical substances in laboratories.

Heating installations

The emissions considered are those of CO_2 and of NO_x. The emission of CO_2 follows directly from the amount of gas used; see the numbers under Energy Use above.
The emission of NO_x is also related to the amount of natural gas and to the state of the heating installations. All heating installations are regularly maintained and checked. Installations with a thermal capacity of less than 900 kW fall under the regulation of the Degree type approval heating installations airpollution NO_x (Besluit typekeuring verwarmingstoestellen luchtverontreiniging stikstofoxiden). Installations with a thermal capacity of more than 900 kW fall under the regulations of the Degree emission requirements medium sized combustioninstallations (Besluit emissie-eisen middelgrote stookinstallaties). Due to the lack of accurate technical specification sheets from older installations the amount of produced NO_x can only be estimated. Based on a conservative calculation the emission is around 721 kg per year.

Cooling installations

As in previous years the maintenance of all cooling installations was outsourced to a certified external company. The objectives of this contract are twofold: 1) Ensure that installations are leak-proof and 2) Advise to replace installations at the end of their technical lifecycle.
In 2011, eight installations with R22-coolant were dismantled. The nominal amount of R22 within these 8 installations was 41.2 kg. Due to loss of coolant by maintenance and leakage, 28.5 kg were retrieved for recycling. The loss of R22 accounts for 12.8 kg, which corresponds to an emission of 23.5 tonnes CO2.
Due to leaks 0.5kg of R134A and 0.85kg R410A were lost, amounting to a CO2 emission of 2.5 tonnes
The total amount of R22-containing air conditioning units located within the institute's premises is, as of 1 January 2011, reduced to 7.

Volatile Organic Compounds

There was no use of VOC in 2011, the amount used in 2010 was already very low (33 litres).

Waste

In July 2010 the JRC-IET has renewed the contract for waste disposal and recycling. The new contract foresees that the amount of household waste, paper, wood, glass, metal and electro waste is monitored (weighed). Only one certified company specialized in waste treatment and proper disposal and the recycling of materials.

Waste separation unit at JRC IET

Beside the disposal of old scientific equipment to a recycling company the approach of the Institute is to offer it to high schools for scientific and education purposes.
The amount of household waste shown for 2008 and 2009 in the table below was estimated based on the frequency of disposal, the volume of the waste bins and factor of 150kg waste/m^3 (www.milieuzorgoverheden.nl). Now it appears that the estimated weight was over sized by approximately 10 times.

Table Type of waste by volume or weight

Type of waste	2008	2009	2010 **	2010 July – December	2011
	Amount (kg)	Amount (kg)	Amount (kg)	Amount (kg)	Amount (kg)
Household waste	108.680	108.575	10.160	5.080	9.110
Paper and cardboard	9.820	9.250	9.770	4.885	11.530
Wood	4.200	5.600 Wood A 800 Wood B 4.800	3.560	1.780	3.000
Glass	0 *	1.500	400	200	0
Metal	2.200	3.000	2.600	1.300	6.000
El. equipment			9.120	4.560	3.800

* This waste was collected on site, disposal will take place in 2009.
** Estimated production based on July – December 2010 figures (measured).

Type of waste	2008	2009	2010	2011
	Amount (kg)	Amount (kg)	Amount (kg)	Amount (kg)
Small chemicals:				
Batteries	110	53	50	96
Cartridges	0**	140 pieces	76*	50
Laboratory mixed waste	0**	150	118	93
Oil filters; oil containing products	0**	0	25	0
Spray containers, paint	0**	15	40	0
Developer	0**	700		0
Oil	0**	0***	50	0
Medical waste	17	5,4	4	3
Fluorescent lamps (*TL-buizen*)		161		0
Diesel oil		7,1 l		1

* Cartridges are collected in special boxes which are made available by the supplier of office material and are returned to the supplier for recycling.
** This waste was collected on site, disposal will take place in 2009
*** This waste was collected on site, disposal will take place in 2010.

Internal recycling

Packaging material, like foam chips, is removed from incoming packages and reused (about 1.000 litres in 2011).
Wood from different kind of transport packages is partially reused to make new containers for transport of material and equipment.

Water

The consumption of water in different buildings was measured using the building management system. However, for facilities/laboratories it is not reasonable to split the water consumption between household water and process water because the water consumption for processes is low.

The FCTEST facility, located in building 310, is the only facility at the Institute which has a substantial consumption of water in the work process. In general the water consumption of the Institute is stable.

The system for the fire extinguishing water was changed into a ring covering the whole research location Petten. The total amount of water put into the ring is known, but cannot be split per company Therefore, no amount can be given for the fire extinguishing water at IET only.

Table Water consumption in m^3

Building	2009	2010	2011
Total	2845	3058	6278
113	59	75	25
300	51	62	59
308	281	317	337
309	209	345	261
310 (incl. FCTEST)	1171	1277	4.468
311	4	0.5	0
312	515	500	505
313	209	277	289
314	126	67	71
315	92	89	73
320	32	27	27
325	95	124	163
330 (temporary offices)	NA	NA	NA
Construction site	NA	NA	NA
Fire extinguishing water	NA	NA	NA

Emission to water

The discharge of water to the sewers equals the consumption of water plus the water produced and discharged to sewers by the FCTEST facility, minus the water collected from the chemical laboratories in 312 (this building has an additional collection circuit for waste water from the laboratories).
Concerning the discharged tap water or de-ionized water produced by the FCTEST facility we assume an estimation based on the operating time during 2011.
Tap water for the FCATS is used for the steam generator and the Septron EDI.
The estimated consumption is based on the assumption that the FCATS facility has run using de-ionized water for 90 days and what we call the water production system (Septron EDI) has run for 340 days.
Then :
1) Water produced and discharged to sewage per year: 489 m^3
(via the Septron EDI) => [(15% of 400 l/h)* 24 * 340]
2) Water produced and discharged in the air per year: 3.9 m^3
(via steam generator and FCATS) => [(150gr/m3 of H2O * ((600 l/min of Air+H2 or 36m3/h) * 8 * 90)] = 150gr * 46080 m3 of Air+H2/year.

The waste water from the chemical laboratories in 312 is collected in separate tanks. These are emptied by an external certified company. In 2011 the amount of this waste water was 4 m^3.

The total amount of water discharge into the sewers was therefore 6278+ 489 – 3.9 – 4 = 6759.1 m^3.

The release of heavy metals and relevant inorganic emissions to the drain system is given in the table below. The measurements are performed by one external company for all the Petten site organisations at different locations.

Waste water tank

Table *Inorganic emissions to the sewer system*

Substance	Concentration (g/m^3)			
	2008	2009	2010	2011
Chloride(Cl^-)	210	230	260	200

Table *Release of heavy metals to the sewer system*

Metal	Concentration (mg/m^3)		
	2009	2010	2011
Cadmium (Cd)	< 1	<0.4	<0,4
Chromium (Cr)	< 2.5	15	6,3
Copper (Cu)	120	190	220
Nickel (Ni)	< 2	14	<5,0
Lead (Pb)	< 8	<5	<5,0
Zinc (Zn)	120	180	140
Mercury (Hg)	0.46	<0.3	0,14
Arsenic (As)	< 10	<2	<1,5

Based on the requirements of the Waste Water licence (Wvo), which is now a part of the environmental licence, IET is annually taking samples of waste water generated at specific workplaces. As a result of this IET has decided to place more sample pits for better evaluation of waste water.

Soil

Considering that the soil investigation campaign of 2004 showed a generally good quality of the soil in the area of the Institute, no actions were required in 2011.

Storage of dangerous substances and gases

The chemicals and gases are stored according to the CPR 15 and the environmental licence. The capacity has not changed significantly during 2011. The storage facilities are maintained by an acknowledged company on an annual basis.

European Commission

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Abstract

This report is the integrated Safety, Health and Environmental Annual Report 2011 of the Institute for Energy and Transport (IET) of the Joint Research Centre (JRC). The report is split in a health and safety part and an environmental part. The report includes description of the organisational systems and structures together with the planned activities and the achieved goals. The environmental part contains in addition assessment of the environmental impact of the Institute. This report only refers to the activities of the JRC-Petten site of the Institute.

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As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

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